Procedure to Change the Monochromator Energy Range

1. Query current status of monochromator: read the current position of motor 'mon' (mname: monochromator) in the beamline motors window group (units are degrees) located under beamline macros in GrEPX.


2. Verify that the current setting agrees with the encoder. If the encoder reads zero, it's wrong (this could result from a power dip). In this case, dial in to the encoder display the current position of mon reported in the window above. If the encoder reads something close to what GrEPX reports for the current position of motor mon, but not exactly (e.g. off by a few hundredths of a degree or less), you can presume that the encoder is correct, and update the position of mon by resetting it in the (set) position field.

3. Move mono to center of its travel range, i.e. the exact midpoint position between its low and high limits. This is done by entering the target position into the appropriate move field in the display, and clicking "absolute move". Verify motor position by checking backside of the monochromator, blue square. You can query mon limits via MonoLimits macro in GrEPX.
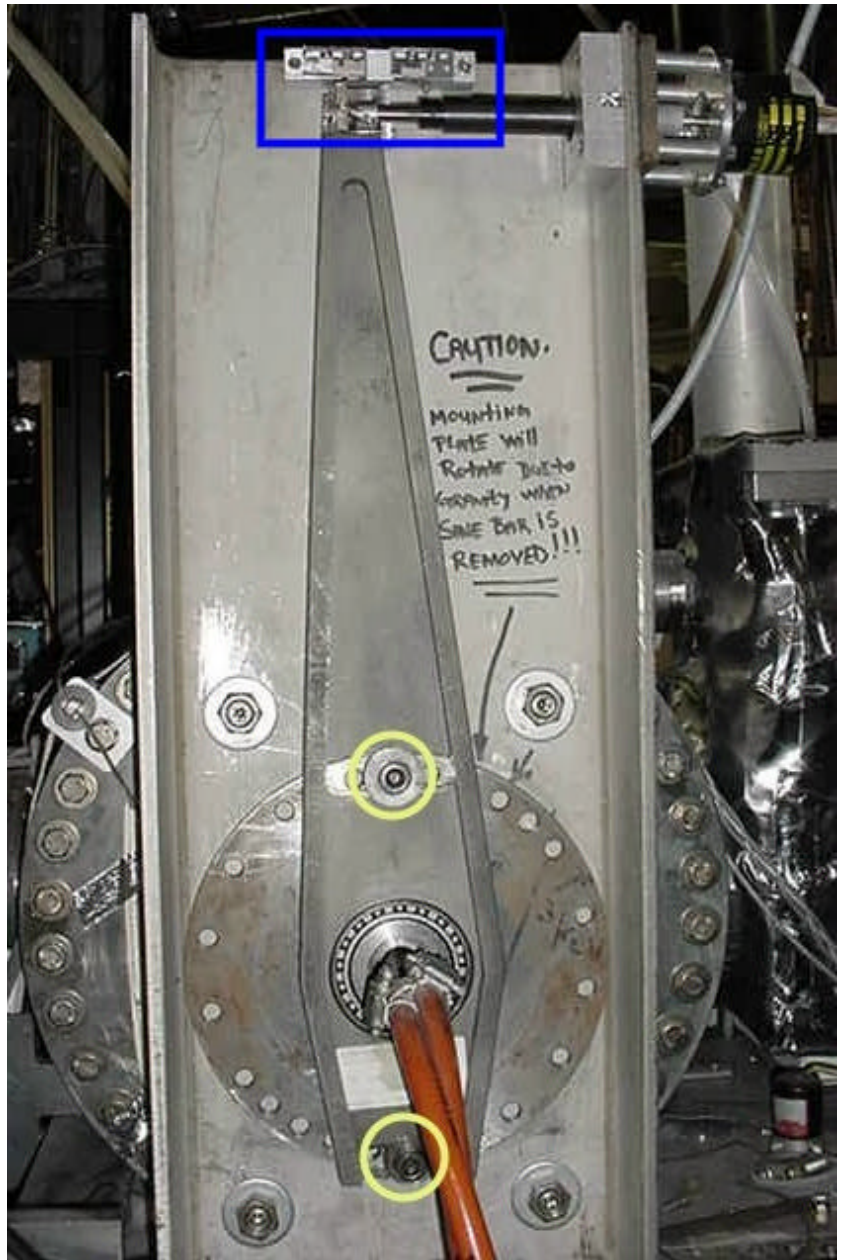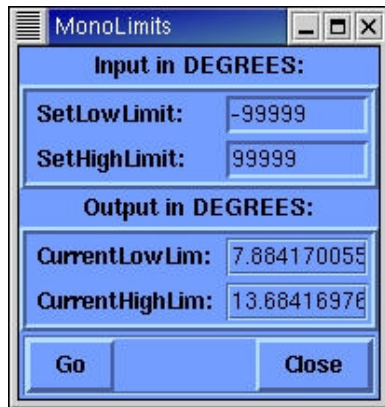
4. Go to the backside of the monochromator (by X26A), and release the top and lower clamping screws (yellow circles) that affix the tangent arm to the spindle wheel. Please hold the tangent arm securely while doing this, to avoid over-stretching the short spring that forces the arm against the motorized micrometer.

5. Gently turn wheel. Clockwise to go to a higher energy (shorter wavelength), counterclockwise to go to a lower energy (longer wavelength).

6. Turn wheel until encoder, pictured above reads the correct angle for the required energy (wavelength) that will center the desired new tuning range. The chart in the white operations binder at X25 displays the angle vs. energy

7. Tighten clamping screws after the correct setting has been attained. It may be necessary to first undo the screws completely, and transfer them to different tapped holes in the spindle wheel, if the originally used tapped holes are no longer accessible as a result of a sizable adjustment of the tuning range. There are multiple tapped holes to choose from.

8. Update the position of the mon (monochromator) motor, in BEAMLINE MOTORS window, to agree with the encoder display, by resetting it in the (set) position field. The monochromator software limits are automatically updated. To view the new limits, first close, then reopen, MonoLimits display.

9. Run max to maximize the beam intensity (this requires that beam is available and photon shutter is open).

10. Move to desired energy (wavelength) the way you normally would.

11. After reaching desired energy (wavelength), repeat steps 1 and 2 above. Often, after pursuing this procedure, there may occur a slight "slip" of the monochromator angle (resulting from wind-up of the spindle seal) that gets taken care of once the motor drive gets going. This could result in the encoder reading differing from the mon position reported in the Beamline Motors windows by a small but noticeable amount. If significant (more than a few thousandths of a degree), then presume that the encoder display is correct, and reset the mon motor position in accordance with step 2 above.

12. One final step, as a courtesy and diagnostic tool, please note and write down the new monochromator limits, if beam is available C2, C3 and C4 counts (please run max and lineup first), aperture size, wavelength, and ring current in the beamline logbook. The MonoLimits display window shows the limits in units of degrees. Note MonoLimits window must be closed, then reopened, to display the current limits as described in step 8. For our users, please post a note in front of the computer display with the monochromator range in photon energy and wavelength. To convert the monochromator angles to photon energy and wavelength, use macro ConvertAngle located under beamline macros in GrEPX.

Note macros ConvertWave and ConvertEnergy are available under beamline macros in GrEPX.